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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,896	07/20/2005	Kazuya Okabe	T-1470 MP-YU5904-P-US	1789

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EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1726	

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03/15/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/542,896	OKABE ET AL.	
	Examiner	Art Unit	
	CYNTHIA LEE	1726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5 and 8-24* is/are pending in the application.

4a) Of the above claim(s) *8-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

This Office Action is responsive to the amendment filed on 5/19/2010. Claims 6, 7 are canceled and claim 24 is added. Claims 1-5, 8-24 are pending. Claims 8-23 are withdrawn from further consideration as being drawn to a non-elected invention. Applicant's arguments have been considered and are persuasive. Thus, claims 1-5, 24 are non-finally rejected for reasons stated herein below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugahara (JP 09-007591) in view of Hayashida (US 2001/0041292), Katou (JP 2002-309327) and Okada (JP 2002-256301).

Sugahara discloses a hydrogen storage alloy comprising rare earth metal, nickel, and transition metal elements [0013, 0014]. It comprises a layer of nickel with a thickness of 50-200 nm on the surface of the alloy [0017] formed by immersing a hydrogen storage alloy in an alkali solution [0016].

Sugahara discloses a hydrogen storage alloy electrode, but does not disclose a nickel-metal hydride battery per se, nor a positive electrode comprising mainly of nickel

hydroxide and an electrolyte composed mainly of aqueous solution of alkaline metal hydroxide. Hayashida teaches a nickel-metal hydride battery, a positive electrode comprising mainly of nickel hydroxide [0238] and an electrolyte composed mainly of aqueous solution of alkaline metal hydroxide [0252] and a negative electrode made of hydrogen storage alloy [0244]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the negative electrode of Sugahara to the battery of Hayashida for the benefit of generating electrical power.

The limitation "a layer that contains more nickel than a matrix component does" is met by the alkaline treatment of the hydrogen storage alloy powder because the instant Specification pg 8, lines 10-16 states that:

"(4) The sealed type nickel-metal hydride battery according to any one of (i) to (3) above, wherein the cracks in said hydrogen storing alloy powder is formed by absorption of hydrogen into the alloy powder, and the hydrogen storing powder with cracks formed therein is treated with an alkaline aqueous solution, whereby the layer that contains more nickel than does the matrix component is formed."

Sugahara discloses a layer of nickel with a thickness of 50-200 nm on the surface of the alloy, but does not disclose cracks on the surface of the alloy covered by the nickel layer. Katou teaches that cracks are formed on the hydrogen alloy during charge and discharge and if the cracks are not covered, capacity diminishes due to the exposure of the electrode to the electrolyte [0008], and thus teaches of forming the hydrogen storage alloy with cracks and covering the cracks and the surface of the alloy with a layer of nickel [0010]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form cracks on the hydrogen storage alloy of

Sugahara, as taught by Katou, prior to forming Sugahara's nickel layer for the benefit of protecting the hydrogen storage alloy from electrolyte exposure, as taught by Katou.

Regarding claim 1, Sugahara modified by Hayashida and Katou does not disclose the mass saturation magnetization and the magnetic nickel content as claimed by the Applicant. Sugahara discloses that the thin layer of nickel is formed by immersing the alloy in alkaline hydroxide solution [0016]. The immersion temperature and time can be suitably decided in which the temperature is usually 80 C to 110 C. Sugahara thus clearly teaches that temperature and time of immersion into alkaline solution is a result effective variable. It has been held by the courts that discovering an optimum value or workable ranges of a result-effective variable involves only routine skill in the art, and thus not novel. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05. Further, Okada teaches of immersion hydrogen storage alloy in alkaline hydroxide solution containing 30-80 wt% and heated at 90 C or higher. See Abstract. Okada teaches that the concentration of the alkaline solution and the temperature of the treatment are result effective variables, as stated in par. [0068]. It has been held by the courts that discovering an optimum value or workable ranges of a result-effective variable involves only routine skill in the art, and thus not novel. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05.

Regarding claim 1, Sugahara modified by Hayashida, Katou, Okada does not teach the hydrogen storing alloy particle further containing one or two or more metals selected from the group consisting of erbium, yttrium, and ytterbium. Sugahara discloses a hydrogen storing alloy particle having Ni, Co, Mn, Al in the amount of 3.60,

0.75, 0.35, 0.30 (which equals to 4) and Lm in the amount of 1.00. See Abstract. Sugahara discloses a AB5, or a LaNi5 system alloy [0014]. Kaneko teaches an alloy having a composition with decreased content of transition metals containing nickel as a main component relative to the rare earth metals (referred to as "R-rich composition" hereinbelow) has larger hydrogen storage capacity than the AB.sub.5 type alloy, but is prone to have a hydrogen-induced amorphous phase formed upon absorption of hydrogen, which causes rise in hydrogen desorption temperature, thereby having substantially inferior hydrogen storage capacity to that of the AB.sub.5 type alloy (2:57-67). First, by generating a particular amount of crystals containing antiphase boundaries therein in a particular distribution in an alloy with R-rich composition, formation of the amorphous phase is prevented, and initial activity for hydrogen absorption and desorption is improved. The present inventor has further found that the presence of such antiphase boundaries favorably affects preventing of decrepitation due to absorption and desorption of hydrogen. It is believed that the presence of such antiphase boundaries favorably affects the hydrogen absorption properties because rare earth elements are arranged along the antiphase boundaries, through which hydrogen can easily be transferred (3:1-13). Second, the introduction of the antiphase boundaries causes disadvantages in the battery life since the antiphase area has high density of rare earth elements, resulting in inferior corrosion resistance against a electrolytic solution. In the light of this disadvantage, the present inventor substituted a portion of the light rare earth elements employed in the A-site by a particular elements including heavy rare earth elements (referred to as "reducing element L" hereinbelow)

to arrange a large amount of the substitution element L in the antiphase area, thereby improving the battery life. It is assumed that such improvement by introducing the substitution element L is due to the effect of moderating the excess binding force between the light rare earth elements and hydrogen in the antiphase boundary area (3:15-27). The "L" elements include Er, Yb, Y (3:43). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Er, Yb, Y to the alloy composition of Sugahara, as taught by Kaneko, for the benefit of preventing the decrepitation due to absorption and desorption of hydrogen, thereby improving the battery life.

Regarding claim 24, the instant Specification supports that the limitations of the mass saturation magnetization and the magnetic nickel amount in claims 1-4 are met by wherein the alkaline solution has a specific gravity of 1.3-1.5, the alloy is treated between 1-10 hours and a temperature between 80 C to boiling. Refer to the instant Specification pg 34, 1st full par., pg 42, 1st full par. and Tables 2 and 3 on pg 43. Thus, the limitations of claims 2-4 are inherent in the combination of Sugahara modified by Hayashida, and Okada. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999).

Response to Arguments

Applicant's arguments 12/21/2010 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CYNTHIA LEE whose telephone number is (571)272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-12922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia Lee/
Examiner, Art Unit 1795